

Health care logistics: who has the ball during disaster?

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In contemporary organizations, a wide gamut of options is available for sustaining and supporting health care operations. When disaster strikes, despite having tenable plans for routine replenishment and operations, many organizations find themselves ill-prepared, ill-equipped, and without effective mechanisms in place to sustain operations during the immediate aftermath of a crisis. Health care operations can be abruptly halted due to the non-availability of supply.

The purpose of this work is to add to a necessary, growing body of works related specifically to health care logistics preparedness and disaster mitigation. Logistics management is a specialized genre of expertise within the health care industry and is largely contributive to the success or failure of health care organizations. Logistics management requires extensive collaboration among multiple stakeholders—internal and external to an organization. Effective processes and procedures can be largely contributive to the success or failure of organizational operations. This article contributes to the closure of an obvious gap in professional and academic literature related to disaster health care logistics management and provides timely insight into a potential problem for leaders industry-wide.

One critical aspect of disaster planning is regard for competent logistics management and the effective provision of necessary items when they are needed most. In many communities, there seems to be little evidence available regarding health care logistics involvement in disaster planning; at times, evidence of planning efforts perceptibly end at intra-organizational doors within facilities. Strategic planners are being continually reminded that health care organizations serve a principal role in emergency preparedness planning and must be prepared to fulfill the associated possibilities without notification. The concern is that not enough attention is being paid to repeated lessons being observed in disasters and emergency events.

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Health care logistics management in disasters is comparable to an American football game or European rugby match. One player has the ball and is running feverishly toward a goal with two teams of players in pursuit—some defending movement while others are attempting to gain possession of the ball. Suddenly a player from another direction tackles the one carrying the ball resulting in a huge melee of players with a seeming primary goal of recovering a lost object somewhere under the pile. As spectators watch from the sidelines, a question often comes to mind—who has the ball? The primary objective for health care professionals is, once an incident has occurred, getting the ball back into play as quickly as possible. What would happen if the players either did not find the ball or if no one knew who was responsible for carrying it for the next play? Worse yet, what if neither team picked the ball back up and

resumed play? Such may be questions that are applicable to the management of health care logistics during crises.

One critical aspect of disaster planning is regard for competent logistics management and the effective provision of necessary items when they are needed most. Many types of organizations are being asked to step outside of previous emergency preparedness paradigms and adjust the concepts within which resources are planned for and supplied. In many communities, there seems to be little evidence available regarding health care logistics involvement in disaster planning; at times, evidence of planning efforts perceptibly end at intra-organizational doors within facilities. Strategic planners are being continually reminded that health care organizations serve a principal role in emergency preparedness planning and must be prepared to fulfill the associated possibilities without notification.

While literature provides great examples of disaster responses and preparedness efforts, little information is being documented concerning health care logistics management. Instead, as is related by Hale and Moberg (1), logistics managers must rely almost exclusively on existing models and information doled out by federal emergency management agencies; most of which is not relevant (directly) to health care processes. Information, ordinarily extrapolated from extended enterprise, must be adapted to health care supply chain and logistics processes to fit applicable business settings. A purposive search was performed, therefore, among various online literature databases (e.g. ProQuest, EBSCOHost, etc.) using words such as hospital resiliency, hospitals and disaster management, emergency management, continuity of operations planning, disaster planning, and disaster recovery (see Table 1).

Literature queries yielded mostly information concerning clinical processes related to subject areas such as pandemics, weapons of mass destruction, records management, communicable diseases management, nursing practices, and so forth. The majority of works reviewed were oriented specifically toward the epidemiologic impact of disaster on urban epicenters or growing rural populations that could be affected by disaster—few emphasized continuity in logistics operations, processes, or procedures. These aspects of health care strategic planning are relevant to all medical, dental, veterinary, and other allied health areas of concern as well.

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Table 1. Keyword and research availability

Keyword	Number of articles located	Number of articles with some applicability
Hospital resiliency	184	38
Hospitals and disaster management	101	17
Emergency management	132	23
Continuity of operations planning	1	0
Disaster planning	93	24
Disaster recovery	51	8

ment is a specialized genre of expertise within the health care industry and is largely contributive to the success or failure of health care organizations. This article contributes to the closure of an obvious gap in professional and academic literature related to health care logistics management and provides timely insight into a potential problem.

Phased emergency management model

Many professionals tend to see emergency planning as a product of other efforts and not as a process in and of itself. The actions taken prior to, immediately after, and as part of the mitigation phase of disaster planning are continuous and should take place in a defined manner to yield the best results (see Fig. 1). Action begins with the occurrence of a new event and continues throughout the



Fig. 1. Phases of emergency management. Adapted from FEMA (2) Emergency Management Model.

post-event evaluation and control of the levels of response.

This work is not aimed at explicating a disaster management model. This article is designed to aid health care professionals understand the necessary implications of including logistics planning in disaster management and crisis mitigation. The development of contingency plans must be related to an ongoing process and supply chain professionals must stay involved (3). Contingency planning, as related by Zuckerman (4), is designed to address a specific singular uncertainty in a given scenario. Strategists should desire to set the conditions that can lead to process innovation and implementation. An integral element in effective process management is collaborative communications among multiple stakeholders.

Health care logistics management perspective

There is no one-size-fits-all approach to disaster planning. While there are specific core functions that a health care supply chain must serve, little effort or attention seems to be afforded disaster mitigation or emergency response measures. Characteristically, this is demonstrable of a cataclysmically faulty assumption that if an agency plans effectively for routine operations, disaster scenarios will be adequately prepared for through some standardized fashion. During crises, supply chain management functions are not always monitored effectively and are sometimes discounted entirely during disaster planning.

Planning for logistics management involvement in a disaster provides health care leaders with an ability to identify, dispatch, mobilize, and demobilize support teams and track, record, and manage critical material resources needed during a crisis event before one occurs. Finding ways to get necessary material and resources to personnel and facilities during a crisis often requires varying degrees of logistical networking, flexibility, and creativity. Planners should develop an understanding of where supplies are, where they need to go, what supplies will be needed the most, how often, and through what means organizations can receive material most effectively.

While health care operations can be abruptly halted due to the non-availability of supply, there is a limit to what any singular organization can achieve without interagency support during emergencies; planning for this type of continuity in operations must happen beforehand. In the past, according to Joint Commission (5) literature, health care organizations have systematically and methodically operated in isolation from other agencies and the communities in which they served; little, if any (at times), collaboration was used to ensure a tenable disaster preparedness plan was in place for the one type of organization to which all citizens would turn in the event of a major event. Using the Joint Commis-

sion's guidance as a foundation for understanding logistics involvement in disaster planning, there are six elements that health care strategists should consider in developing emergency response plans.

Define the customer

Defining requirements for health care processes gain complexity in that a customer can range from the surgeon in an operating room to a patient awaiting the fill of a prescription at a pharmacy. A wide spectrum of others could include emergency medical technicians, firefighters, first responders, police officers, or a wide array of victims of incidents. Regardless the identity, logisticians must focus on what will be needed most at the time of a disaster and plan accordingly.

While it is virtually impossible to plan for every possibility, leaders should focus on the highest potential occurrences that could affect operations. Some of the complexity within health care stems from a perceptible industry-wide view of *the health care organization* being the nucleus for all activities around which others must plan; however, the health care organization is but one of many entities in an event (see Fig. 2). The environment within which the agency operates often defines how an agency can act during a crisis event. Logisticians can serve an organization well by remaining cognizant of necessary resources, without which an organization cannot function, and from whence those resources will come. Those same resources come from suppliers, who can also be affected by their respective external supplier—also, potentially, affected by the same disaster. The material and equipment received for the sustainment of health care operations will, in turn, contribute to the adequate provision of services and products to internal and external stakeholders.

Disaster strikes health care organizations of all types, designs, and employment and prompts many leaders to believe that such agencies must maintain a posture of preparedness to alleviate problems associated with the onset of crisis. More importantly, if a disaster effects one organization, multiple others will likely also be affected. By proactively identifying parameters within which to establish disaster planning, health care organizations can be better equipped to develop a corporate culture of readiness (5).

Developing preparedness and readiness become key factors in health care disaster planning and resilience. Planners need to ask how agencies can plan to be more resilient during catastrophic events, how can hundreds of voices be incorporated into strengthening relationships within communities, and what changes may be included in future plans to prevent future shortfalls? Mitigation is an imperative in disaster planning and readiness. When mitigation fails entire communities become victims. For example, Hurricane Katrina has been cited as one of the

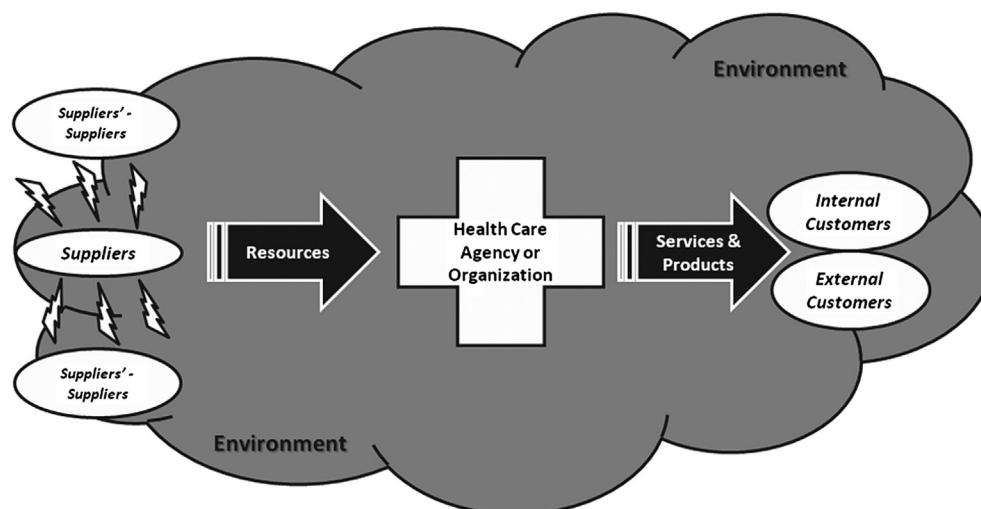


Fig. 2. Interconnectivity of emergency management planning. Adapted from Freeman (6).

deadliest and most costly natural disasters in US history (7); many lessons have been learned and have served as the catalyst for much resurgence in planning for and sustaining communities during wide spread emergencies. The Department of Health and Human Services (DHHS), in example, has now begun to incorporate planning for *social distancing* (voluntary quarantining) and storing and distributing contingency supplies (medical stocks, food, water, etc.).

The Oklahoma City bombing in the 1990s, the attacks of September 11, 2001, London and the Madrid train bombings are all contributing to ongoing analyses of violent events and how they impact communities (7). Such evaluation is focusing efforts toward evacuation, transportation, health, medicine, pollution, emergency medical care, triage, asset staging, chemical, biological defense practices, and community-wide response to populations. One such population that is gaining more attention due to these types of events includes the elderly and special needs populations. According to Edwards, 2009 (7) of the more than 1,300 deaths related to Hurricane Katrina and her cascading events, a vast majority of those were elderly and special needs victims. Defining and knowing a customer base prior to events, planning for and developing well conceived planning documents contributes to more effecting facilitation of robust mitigation practices (8).

Determine risks and hazards a community faces

Emergency preparedness involves a focus on key aspects of preservation, capabilities, and community-wide health care resources to provide a continuance of care for patients, staff, and to serve the public (5). Barriers to emergency preparedness include lack in clarity regarding responsibilities related to preparedness and resource allocation, criticality of elements in planning and re-

sponse processes, effectiveness of collaborative coordination and synchronization, and knowledge of methods for obtaining assistance from inter-agency enablers external to an affected organization (9). In example, a health care organization should include within planning considerations what happens if employees fail to report for work (as has been predicted in many works concerning wide spread pandemics or emergencies); what if roads become impassable (as occurs annually during ice storms throughout the United States or during other types of natural events continentally)?

In contemporary organizations, a wide gamut of options is available for sustaining health care organizations (i.e. on-site inventories, third-party logistics agencies, external transportation resources, and networks, etc.). This was not always the case and recent history shows that while organizations once relied solely on large, in-house, inventories maintained for the continuance of health care operations, modern business strategies tend to suggest agencies rely more heavily upon just-in-time (JIT) inventories and third party logistics to replenish stock at the time material is needed. The JIT strategies are inherently flawed in many types of disaster preparedness efforts and scenarios. When disaster strikes, despite having tenable plans for routine replenishment and operations, many organizations find themselves ill-prepared, ill-equipped, and without effective mechanisms in place to sustain operations during the immediate aftermath of a crisis.

Determine current capacities and capabilities and setting goals for preparedness

Critical in disaster planning is skilled logistics oversight and the provision of necessary items when they are most necessary. The involvement of a competent logistics manager is invaluable when planning for crises. Discus-

sions related to resource management often posit emphasis directed upon human capital and money, but do not always focus on materiel readiness within health care organizations (10). While it is necessary to have clinicians, other health care professionals, and financing available during a crisis, without the proper provision of necessary and applicable supplies, professional skill and aptitude will be perceptibly wasted.

A key component in crisis mitigation includes inter-agency relationships that have been previously forged. Established relationships can serve as platforms upon which response planning can be built. Integrating logistics processes into corporate strategy has a more significant impact on customer value than most other processes (11). Collaboratively developing an emergency management plan contributes to an integrated, comprehensively focused plan that ensures adequate levels of focus on scope of services being provided and the population being served. Effective collaboration also permits an identification of associations among multifaceted stakeholders providing basic societal functions based on recognized roles and responsibilities.

Efficiency in emergency supply chain management means allocating adequate resources to achieve the greatest aggregate benefit for as many people as possible (12). Medical material constitutes a special category of consumable supply for which many health care logistics managers and strategists, for reasons unknown, forget to plan. To the extent with which they can be planned for, items such as various pharmaceuticals, water treatment/sterilization tools, first aid supplies, biological countermeasures, and so on can be maintained to mitigate perceptible or potential shortfalls in health care capabilities. The key is planning prior to an event to mitigate

potential economic and infrastructure shortfalls. Part of this preparedness stems from the right stakeholders being involved with one another to provide for the needs of the patients being seen.

This concept was demonstrated in a military task force's response to a snow avalanche in Afghanistan during the winter of 2009. A concerted effort among non-medical and medical logisticians and clinical staff members from a variety of agencies yielded over 250 Afghani patients being treated and readied for return to their homes after having been flown to Bagram Airfield for care (13). The health care logistics personnel solicited feedback from clinicians to quickly assess which supplies would be most critical at an interim staging base where patients would make initial contact with a medical system. Using the clinician input, the logisticians were able to resupply cyclically throughout the disaster event contributing, ultimately, to only a handful of patients being sent to the hospital for more extensive care for injuries incurred during the sub-freezing temperatures on the mountainside. The critical path to success for the logisticians was effective collaborative communications between clinical staffs and the supply chain, flexibility in responding to evolving requirements, and ensuring the right material was provided to the clinicians in a timely manner.

Develop an integrated plan

Melville stated, 'we cannot live only for ourselves. A thousand fibers connect us with our fellow men; and among those fibers, as sympathetic threads, our actions run as causes, and they come back to us as effects' (14). The culmination of most disaster preparedness planning efforts should be synchronized, effective, well-designed

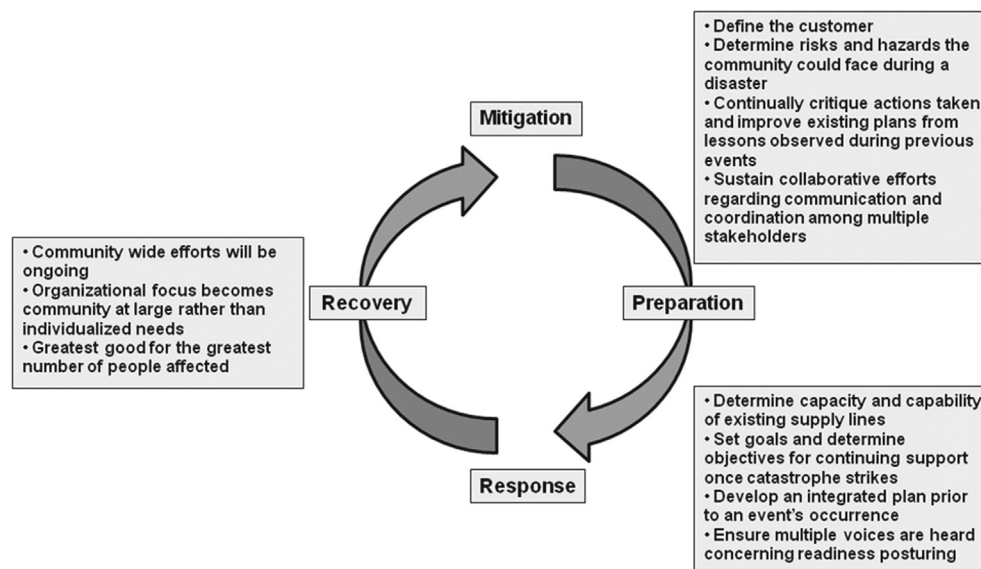


Fig. 3. Phases of emergency management with linkage to the Joint Commission guidance.

response and recoveries at the time of an event. Planning and periodic adjustments should be cyclic throughout multiple phases of emergency preparedness and should involve both clinical and non-clinical expertise in the solidification of a tenable plan (see Fig. 3).

The purpose of a supply chain is to serve end users effectively by providing a process through which material is moved from a supplier to an end user along a continuum of multiple layers of internal and external stakeholders (15). While it is not uncommon for material to begin to arrive shortly after a crisis event occurs, an unorganized, non-systematic response to managing logistics can result in a haphazard approach to incident resource allocation and crisis mitigation. Herein health care logisticians gain credibility when prior planning efforts function correctly. In planning for an emergency response situation, logisticians should seek to minimize response time while maximizing resource capability in concert with other health care strategic planners and clinical staffs. Once events have culminated, mitigation includes the integration of lessons observed into revisions of disaster management documents.

Critique and improve the integrated community plan

Throughout the world, the health care industry often has an established supply chain network that tends to work well when employed properly and during *routine* operations. Reliance upon national level governments should not always be the automatic fall-back for health care organizations faced with crises; albeit, this seems to be the evolving trend in massive emergency scenarios. Government response, in national-level emergencies, should only be required to flow emergency medications, medical supply, and equipment into existing logistics networks if health care entities are not available or cannot be reached (9).

Upon the recognition of an imminent need or during a public health emergency, medications (and other medical supply) could be shipped quickly to pharmacies, public health agencies, physician offices, home health organizations, and other ancillary care agencies. The public, in a mass crisis, could be instructed to go to their normal pharmacy, doctor's office, or to a public health agency to acquire the emergency medical supplies. Additionally, clinical staffs could be positioned throughout affected communities to distribute medical supplies to a citizenry during a disaster instead of relying on non-medical personnel distributing medications, supplies, and information of which they may or may not be familiar. Clinical professionals are infinitely more reliable and resourced for distributing medical supply, information, and education than any information flyer or non-medical agency.

Sustain collaboration, communication, and coordination

Health care logisticians should look beyond internal organizational capabilities and, when necessary, be prepared to seek assistance from extra-organizational resources. Logistics managers should never plan in a vacuum but should incorporate other leaders into planning processes. Health care logistics professionals own the onus for communicating supply chain concerns in all aspects of emergency planning within and among respective organizations. Logistical difficulties that may arise during emergencies can relate directly to a lack in predictability for operations, limited knowledge concerning length or location of an event, the speed at which an event can occur along with the duration and intensity, potential recurrence, and mitigation of future events (7).

An ever-present aspect of emergency planning should include the idea that regardless how well one believes an organization has prepared, unexpected problems will still emerge. An ongoing collaboration among multiple agencies is essential and should be in place prior to an event's occurrence. An open, ongoing dialogue among multiple agencies is critical to the success of organizations during a crisis once events begin to unfold.

Conclusion

Once the turmoil ends and leaders begin to piece organizations back together after a disaster, the question always arises—who was responsible for what during the crisis? Having a tenable emergency management plan available prior to events beginning to unfold is critical for health care organizations. As related by former US President Dwight D. Eisenhower (while the commander for allied forces in Europe during WWII) plans are useless, but planning is indispensable (16). In preparing for disaster scenarios, planning is truly essential. There is little an organization can do if it has not positioned itself adequately for resiliency through well-designed, rehearsed plans for response and recovery.

Routinely, health care agencies open their doors during crisis to anyone requiring assistance. Why would disaster planners not plan to employ such agencies staffed and equipped with the resources required for managing casualty producing scenarios? By asking such questions, concepts related to emergency preparedness can be revisited prompting the beginning of theoretical development. The concern is that not enough attention is being paid to repeated lessons being observed in subsequent disasters and emergency events. The subject of study is being provided, but little is being done to capture conceptual constructs. Strategic planners are being continually reminded that health care organizations serve a principal role in emergency preparedness planning and must be prepared to fulfill the associated possibilities

without notification; part of that preparation involves effective supply chain management.

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